



Comparison of Islamic and conventional bank stocks by Value-At-Risk method

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ABSTRACT

This article is focused on comparison of Islamic and conventional bank stock volatility by VaR (Value-At-Risk) risk assessment method. The performed analysis has shown that factors affecting stock values for the different financial models are very similar, as well as that including stocks of both Islamic and conventional banks to an investor's portfolio gives no significant benefits in terms of diversification.

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1. Introduction

The major principle of conventional financing is ‘the higher the investment risk, the higher returns’. Nonetheless, relationship between risk and asset returns of Islamic financial institutions, which are an alternative type of stock market investments, is still to be studied.

The purpose of the work is to find out if Islamic bank stocks are less susceptible to financial crises. For this end, a comparison of volatility for Islamic and conventional bank stocks is performed using VaR (Value-At-Risk) method of risk assessment.

Ideally, an Islamic financial institution’s stock value should be less fluctuating and less susceptible to influence of microeconomic factors. Therefore, these stocks are to be less risky and more immune to financial crises. Accordingly, they can bring some benefits if used for investment portfolio diversification purposes.

That said, it remains unclear if all financial instruments of companies that position themselves as Islamic ones really comply with sharia principles. In this connection, the author assumes they do comply.

In the course of the study, the following **hypotheses** are to be verified.

- A portfolio consisting of Islamic bank stocks only would have much lower volatility (lower VaR values);
- Including stocks of both Islamic and conventional banks to a portfolio would give significant benefits for the investor in terms of diversification;
- Correlation between returns of Islamic and conventional bank stocks would be negative in most cases due to differences of factors affecting stock prices for the two dissimilar financial models.

The study covers a broad time frame including both pre-crisis and post-crisis periods - 2007 to 2014.

2. Literature Review

In assessing performance of a stock, an investor always encounter the trade-off between risk and return. Some previous studies employed market risk premium, which was firstly introduced by Sharpe (1965). Market risk premium shows the sensitivity of individual stock price to market movement, known as beta. When examining risk and return of portfolio Fama and French (1995) employed variable excess return of portfolio as the independent variable, and market risk premium of portfolio as dependent variable.

In economic literature, there are few works discussing stocks of Islamic financial institutions. Derigs and Marzban (2009) made comparison of portfolios consisting of Islamic and conventional assets (stocks) from an asset structure perspective. They concluded that, by developing a portfolio strategy based on market capitalization, a portfolio consisting of sharia-compliant assets can be as profitable as a portfolio consisting of conventional assets.

Guyot (2012), based on his analysis of The Dow Jones Islamic Market Index (DJIMI)¹, says the index is more susceptible as compared to the regular Dow-Jones index to such macroeconomic factors as mortgage crisis. Also, the author reports that the Islamic index has no co-integration (relationship) with other indices and is therefore reliable from long-term portfolio diversification perspective. Additionally, Derbel, Bouraoui and Dammak concluded in their study (2011) that the Islamic financial model can reduce a crisis influence, and that the crisis influence is less evident in countries which use Islamic financing methods.

Herwany and Febrian conducted a portfolio analysis (2013) of Islamic and conventional stocks on Indonesian stock exchange. They reported high volatility of a portfolio consisting of Islamic stocks and its strong dependence on changes of macroeconomic indicators. In another study (Yusop, 2008), the author used the Kuala Lumpur Syariah Index (KLSI) and concluded that beta of Islamic company stocks is positive and below 1, which means that investment risks for Islamic stocks on Kuala Lumpur stock exchange is lower than the market risk. Selim (2008) made a similar conclusion.

¹The Dow Jones Islamic Market Index (DJIMI) is a basic index of Islamic companies' capitalization. It makes part of the group of global Dow-Jones indices, which are calculated based on company stocks from 34 countries of the world. The purpose of DJIMI is to establish a clear standard of measuring global stock market indicators according to the existing methodology of calculating DJ indices and to Islamic investment guidelines established by Sharia supervisory board (Musaev, Magomedova. (2015). Special regulations of Islamic financial institutions. Retrieved from <http://rffc.su/?p=840>)

From the foregoing review of empiric studies, we can see that the studies were based mainly on the Islamic index rather than on individual stock prices. Along with that, the analysis of prices themselves for Islamic financial institutions within a portfolio structure makes it possible to derive more information and allow for volatility. Also, Cakir and Raei (2007) used the portfolio analysis to compare sukuk and conventional bonds. To conduct analysis by VaR assessment method, hypothetical portfolios were built, which consisted of sukuk and conventional bonds from different countries. The results were in sukuk's favour; when included in a portfolio of conventional bonds, sukuk gave the investor diversification benefits due to significant decrease of the portfolio's VaR value. We shall apply a similar methodology in this work.

3. Methodology

The VaR method will be used to analyze inclusion to a portfolio consisting of Islamic and conventional bank stocks, in order to find out if this kind of diversification provides any benefits.

For the analysis, we shall take 6 hypothetical portfolios of Islamic and conventional bank stocks. The banks of the following countries were selected: Bahrain, UAE, Jordan, Kuwait and Qatar. The country selection was partly dictated by restricted amount of available data. For the rest, countries where numerous Islamic financial institutions operate without any obvious restrictions were selected intentionally. Simply put, Islamic countries were selected. Islamic and conventional banks were selected based on comparability of their market capitalization. In the frame of the study, data on stock prices for these banks for the period of 2007-2014 was used. All the data was taken from the *finanz.ru* service.

The first portfolio will contain only Islamic bank stocks. In the second portfolio, one Islamic bank will be replaced with a conventional one. In the next portfolio, two banks will be replaced, and so on. As a result, the fifth portfolio will contain stocks of one Islamic and four conventional banks. The sixth portfolio will consist of conventional bank stocks only. VaR of each portfolio will be calculated. Based on the results, conclusions will be made. The table below represents banks selected for the study:

Table 1
List of banks selected for the study

No	Islamic bank	Conventional Bank	Country
1	Al Baraka Banking Group	Al Salam Bank - Bahrain	Bahrain
2	Dubai Islamic Bank	Commercial bank of Dubai	UAE
3	Jordan Islamic Bank	Jordan Ahli Bank	Jordan
4	Kuwait Finance House	Gulf Bank	Kuwait
5	Qatar Islamic Bank	Commercial Bank of Qatar	Qatar

There are different methods to calculate a portfolio's VaR value. In this work, we shall use the one where individual VaR values for portfolio assets are calculated first, then the total portfolio VaR is determined (Nikiforova, 2010). The method uses the formula:

$$\text{Var}_p = \sqrt{V' p V},$$

where

V – a column matrix of VaR values for each share,

V' - transpose of a column matrix of VaR values for each share, i.e. a row matrix,

p - $n \times n$ correlation matrix (n – the number of assets in a portfolio).

To calculate the VaR risk measure for each asset, a method of simulation on history ('delta normal method') will be applied. Among all methods of VaR calculation, this is the most popular one. The simulation will be made in Excel.

Methodology of VaR calculation will be shown for one of the selected Islamic bank stocks - Qatar Islamic Bank. First of all, prices for the period under discussion are to be loaded. According to Bank of International Settlements' guidelines, minimum 250 price data are to be used for VaR calculation². We have daily stock prices for 8 years (in average, 2000 prices per bank).

The next step is to calculate daily returns for the company's shares. They can be derived as the natural logarithm of the previous day close to the current day close ratio.

²Supervisory framework for the use of "backtesting" in conjunction with the internal models approach to market risk capital requirements. Basle Committee on Banking Supervision, 1996. Retrieved from <http://www.bis.org/publ/bcbs22.pdf>

Then, we have to calculate the mathematical expectation and standard deviation values. These are the major parameters of the returns distribution. The mathematical expectation is calculated as an average of all daily returns on shares. For Qatar Islamic Bank shares, the average annualized return for the period under discussion was 3.31%. The standard deviation of return on stock for the bank was 1.95%.

The next step is to determine the normal distribution quantile. In statistics, quantile is the value of the Gaussian distribution function with the defined parameters (mathematical expectation and standard deviation). That is, at these parameters, the function must not exceed the derived value with the defined probability. In our analysis, a 99% probability level will be used. For the bank under discussion, the quantile was 4.56%.

Then, a future stock value at the defined returns distribution parameters is forecasted. For this end, the following formula is applied:

$$P_{t+1} = (q + 1) \cdot P_t;$$

where

q – quantile of the stock return distribution,

P_t – stock price at the moment t ,

P_{t+1} – minimum stock value in the next time period t at the defined quantile level.

To determine forecasted values of the future stock price some periods in advance, the modification of the above formula is used:

$$P_{t+n} = (q\sqrt{n} + 1) \cdot P_t;$$

where

q – quantile of the stock return distribution,

P_t – stock price at the moment t ,

P_{t+1} – minimum stock value in the next time period t at the defined quantile level.

n – forecast depth, for which a probable minimum stock value is determined.

For Qatar Islamic Bank, P_{t+1} value was 97.54 Qatar reals. This means that, with a probability of 99%, the stock value on the next forecasted day will be 97.54 Qatar reals minimum. The stock value on the last day (Dec. 31, 2014) was 103.1 Qatar reals.

Then, the VaR value itself for the bank is calculated a certain number of days in advance. To calculate a relative VaR value (for the analysis in this work, relative VaR values will be used, because the downloaded data on stock prices are in different currencies), we have to calculate the natural logarithm of the stock price forecasted some days in advance to the stock price on the last day ratio (Dec. 31, 2014). That said, VaR_{t+1} for the bank under examination was 4.76%; this means, with a probability of 99%, the stock price on the next forecasted day will be lower by 4.67% maximum than the previous day price. However, for the purposes of the analysis, as the available data covers a large time frame, we shall use a 5-day period (i.e. we will analyze in what lower limits a stock price will be in 5 days with a probability of 99%). This time frame is also more representative (the selected countries have different working days, which results in different trade operations; so one day would be insufficient for correct forecasting) and often used in studies. For Qatar Islamic Bank, the VaR_{t+5} value was 10.77%. Using this methodology, VaR_{t+5} values for all banks under consideration were determined.

Table 2
VaR values for Islamic banks

No.	Banks	VaR_{t+5}
1	Al Baraka Banking Group	0.1717
2	Dubai Islamic Bank	0.1448
3	Jordan Islamic Bank	0.0889
4	Kuwait Finance House	0.1285
5	Qatar Islamic Bank	0.1076

Table 3
VaR values for conventional banks

No.	Banks	VaR_{t+5}
1	Al Salam Bank - Bahrain	0.2167
2	Commercial bank of Dubai	0.1211
3	Jordan Ahli Bank	0.1821
4	Gulf Bank	0.2880
5	Commercial Bank of Qatar	0.0834

We can see that individual Islamic banks do not outgo their conventional ‘rivals’ on this criterion very much, with the exception of Kuwait banks - the Islamic bank’s VaR_{t+5} is 12.85%, while that of the conventional one is 28.8%.

4. Calculation

We make calculations according to the analysis methodology,

Portfolio 1:

Table 4
Correlation matrix of daily returns for portfolio 1 stocks

	Al Baraka Banking Group	Dubai Islamic Bank	Jordan Islamic Bank	Kuwait Finance House	Qatar Islamic Bank
Al Baraka Banking Group	1	0.91	0.87	0.49	0.37
Dubai Islamic Bank	0.91	1	0.82	0.54	0.42
Jordan Islamic Bank	0.87	0.82	1	0.76	0.60
Kuwait Finance House	0.49	0.54	0.76	1	0.69
Qatar Islamic Bank	0.37	0.42	0.60	0.69	1

For this portfolio consisting of Islamic banks only, VaR_{t+5} is 8.31%. This means that, with the probability of 99%, an investor holding a portfolio, which consists of these bank stocks in equal proportion, can lose in 5 days maximum 8.31% of the current portfolio value.

Then, to verify the suggested hypotheses, we replace one Islamic bank after another with conventional ones. The order is determined by the level of correlation between an Islamic and conventional bank of the country (from lower to higher correlation levels).

The correlation of daily returns for Islamic and conventional bank stock prices is presented below by countries.

Table 5
The correlation of returns for Islamic and conventional bank stocks

Country	Correlation of returns
UAE	0.96
Qatar	0.76
Jordan	0.64
Bahrain	0.62
Kuwait	0.54

Portfolio 2:

Table 6
Correlation matrix of daily returns for portfolio 2 stocks

	Al Baraka Banking Group	Dubai Islamic Bank	Jordan Islamic Bank	Gulf Bank	Qatar Islamic Bank
Al Baraka Banking Group	1	0,91	0,87	0,25	0,37
Dubai Islamic Bank	0,91	1	0,82	0,25	0,42
Jordan Islamic Bank	0,87	0,82	1	0,20	0,60
<i>Gulf Bank</i>	0,25	0,25	0,20	1	0,41
Qatar Islamic Bank	0,37	0,42	0,60	0,41	1

$VaR_{t+5} = 8.45\%$. We can see that this portfolio's VaR is 0.14% higher as compared to the previous one, i.e. the replacement of an Islamic bank by a conventional one has caused loss so far.

Portfolio 3:

Table 7
Correlation matrix of daily returns for portfolio 3 stocks

	Al Salam Bank - Bahrain	Dubai Islamic Bank	Jordan Islamic Bank	Gulf Bank	Qatar Islamic Bank
A lSalamBank - Bahrain	1	0,66	0,33	0,12	-0,07
Dubai Islamic Bank	0,66	1	0,82	0,25	0,42
Jordan Islamic Bank	0,33	0,82	1	0,20	0,60
Gulf Bank	0,12	0,25	0,20	1	0,41
Qatar Islamic Bank	-0,07	0,42	0,60	0,41	1

$VaR_{t+5} = 8.00\%$. In this case, after replacement of two Islamic banks by conventional ones, VaR is a bit lower; it has declined by 0.31%.

Portfolio 4:

Table 8
Correlation matrix of daily returns for portfolio 4 stocks

	Al Salam Bank - Bahrain	Dubai Islamic Bank	Jordan Ahli Bank	Gulf Bank	Qatar Islamic Bank
Al Salam Bank - Bahrain	1	0,66	0,53	0,12	-0,07
Dubai Islamic Bank	0,66	1	0,82	0,25	0,42
Jordan Ahli Bank	0,53	0,82	1	0,63	0,68
Gulf Bank	0,12	0,25	0,63	1	0,41

$VaR_{t+5} = 8.32\%$, which is practically identical to the original portfolio which consisted of Islamic banks only.

Portfolio 5:

Table 9
Correlation matrix of daily returns for portfolio 5 stocks

	Al Salam Bank - Bahrain	Dubai Islamic Bank	Jordan Ahli Bank	Gulf Bank	Commercial Bank of Qatar
Al Salam Bank - Bahrain	1	0,66	0,53	0,12	-0,20
Dubai Islamic Bank	0,66	1	0,82	0,25	0,45
Jordan Ahli Bank	0,53	0,82	1	0,63	0,63
Gulf Bank	0,12	0,25	0,63	1	0,66
Commercial Bank of Qatar	-0,20	0,45	0,63	0,66	1

$VaR_{t+5} = 7.95\%$. The risk decreased.

Portfolio 6.

Table 10
Correlation matrix of daily returns for portfolio 6 stocks

	Al Salam Bank - Bahrain	Commercial bank of Dubai	Jordan Ahli Bank	Gulf Bank	Commercial Bank of Qatar
Al Salam Bank - Bahrain	1	0,60	0,53	0,12	-0,20
Commercial bank of Dubai	0,60	1	0,84	0,29	0,56
Jordan Ahli Bank	0,53	0,84	1	0,63	0,63
Gulf Bank	0,12	0,29	0,63	1	0,66
Commercial Bank of Qatar	-0,20	0,56	0,63	0,66	1

$VaR_{t+5} = 8.23\%$. The risk increased.

5. Conclusion

It was found that VaR values for both the portfolio consisting of Islamic bank stocks only and the portfolio consisting of conventional bank stocks only are practically equal (for conventional banks, the value was even a bit better – by 0.08%). This means the first hypothesis is rejected: the statement, ‘A portfolio consisting of Islamic bank stocks only would have much lower volatility’ was not corroborated.

We assumed that the investment diversification could bring significant benefits; however, from the portfolio analysis results, we can conclude that we failed to achieve significant benefits. For all portfolios consisting of both Islamic and conventional bank stocks, the VaR value did not deviate more than by 0.5% from VaR of the original portfolio, which consisted of Islamic bank stocks only, and from VaR of the portfolio, which consisted of conventional bank stocks only. Thus, the second hypothesis is also rejected: the statement, ‘Including

stocks of both Islamic and conventional banks to a portfolio would give significant benefits for the investor in terms of diversification' was not corroborated.

In practice, all signs at correlation matrices of the portfolios under examination, which included both Islamic and conventional banks, are positive. This means that factors, which affected stock prices of both Islamic and conventional banks of the selected countries, were much alike. That said, the third hypothesis is rejected: the statement, 'Correlation between returns of Islamic and conventional bank stocks would be negative in most cases due to differences of factors affecting stock prices for the two dissimilar financial models' was not corroborated.

The target set of the work – to find out if Islamic bank stocks are less susceptible to financial crises – is achieved. That said, the major conclusion of the study can be formulated as follows: a popular opinion that Islamic financial institutions are less susceptible to financial crises than conventional ones can not be corroborated.

Of course, the final results were affected by selection of countries, whose banks were included to the portfolios. While these countries are formally Islamic, they are far from leading positions in the rating of compliance with Islamic economic principles: Kuwait holds position No, 42, Bahrain – 61, UAE – 64, Jordan – 74 and Qatar – 112³. It is worth noting that our study was limited by ten banks only, due to data unavailability. However, probably the major reason of the final results was infrastructural imperfection of Islamic stock exchanges as well as the fact that they allow speculations with financial assets, which is evidenced by Bekkin and Yandiev (2010). This fact apparently levels the originally high immunity of Islamic financial assets to financial crises.

³ Scheherazade S. Rehman, Hossein Askari (2010) An Economic Islamicity Index(EI²) (Global Economy Journal)

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